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coffer-dams would involve less trouble in their construction, and instead of stone watercourses, it would be preferable to substitute large cast iron pipes, of about three feet diameter. Such might be laid without difficulty, and the trees would not injure them. They should be furnished with sluice doors at each end, and a competent person should be appointed to have them charge.

I cannot conclude this letter without stating, that I was accompanied at Kandelly and Tamblegam by Mr. Birch, without whose intelligent aid, and knowledge of the country and language, I should have been at a loss to pursue any inquiry into the subject of this Report.

XVII.—*Explorations into the Interior of Africa.* By Dr. DAVID LIVINGSTONE,* M.D., LL.D., F.R.G.S., etc. (*Gold Medallist.*)

(Continued from Vol. XXVI.)

(Addressed to Sir R. I. MURCHISON, Pres. R.G.S.)

Read, December 15, 1856.

1. *From Cabango to Linyanti; with a Dissertation on the Structure of the Southern Part of the African Continent. Forwarded from Teté on March 3, 1856.*

Linyanti, on the River Chobe,
Oct. 16, 1855.

SIR,—By a note dated Cabango, in August last, I endeavoured to convey an idea of the country between Cassangé and that point, and, if the rough tracing enclosed reached its destination, you will have remarked that there was little absolutely new to communicate. The path followed is that usually trodden by native Portuguese, who are employed by the Angolese merchants to trade with Matiamvo—the “Muata-ya-nvo” of some—the paramount chief of the negro tribes called Londa (Lunda) or Balonda. There is another and straighter course situated a little farther north, and I suppose it is there the scarcity of water mentioned by others is experienced. We never found it necessary to carry a supply, and almost always spent the night at villages situated on streams or rivulets. A Portuguese merchant and planter, Senhor Graça, of Monte Allegre, whose acquaintance I had the pleasure of making, was once a visitor of Matiamvo; and his notes, having been published in the Government Gazette or “Boletim” of Loanda, might, I conceive, still be found in Lisbon.† A severe and long-continued attack of fever, soon after crossing the Quango, made me so very feeble and deaf, that I was glad to avail myself of the company and friendly aid of three native Portuguese, whose employer, Senhor Neves of Cassangé, very politely enjoined them by

* Dr. Livingstone formerly wrote “Livingston,” without the *e*.—ED.

† See R. G. S. Journal, vol. xxvi., pp. 123, 128.—ED.





Matiamvo is the Paramount Chief of Londa & of all the People called Balonda

Well Wooded Country

Pl^s of Lobale impassable in the rainy season

Libonta & People

Victoria Falls (Most-a-tanyal)

letter to forward my plans by every means in their power. The virtue of the Cheboqué (Cheebokwé) was thereby not exposed to temptation to take advantage of my weakness—a temptation which often proves rather too powerful for the goodness of more enlightened specimens of humanity. The most then I could effect in the circumstances was to put down the rivers with greater precision than any of my predecessors, who have uniformly been unfurnished with instruments.

The rate of travelling of such traders may be interesting to those who examine their accounts of journeys to otherwise unknown regions. I found the average between a great number of regular sleeping stations to be 7 geographical miles. The average time required was $3\frac{1}{2}$ hours, and the speed 2 geographical miles an hour. The stoppages from all causes amounted to 20 days monthly; so that a month's journey means actually one of 10 days, or 70 miles. The carriers are very unwilling to help each other; hence the sickness of one man often stops the march of the whole party. When we parted with them, our own rate was $10\frac{1}{2}$ geographical miles per day. This required an average of 5 hours' march at the rate of 2 geographical miles an hour, and we travelled 20 days each month. The negro step was quicker than ours, but we generally overtook them while resting, and arrived in equal times. If we kept going for 6 successive days, both men and oxen showed symptoms of knocking up, although they were a most willing company, and all were anxious to get home. It was therefore necessary to give another day weekly for rest, besides Sunday. The starchy nature of the food had, I believe, considerable influence on the rate of progress. In winding through forest, I could not make any approach to a reckoning of distance; an observation was always necessary. The zigzag would make the day's march to be probably not much under 20 miles in these cases.

I had indulged the hope of proceeding to the head-quarters of Matiamvo, who seems to be located 19 days east-north-east of Cabango, or on lat. $8^{\circ} 20' S.$, long. $22^{\circ} 32' E.$ But the long delay had now made such an inroad into our stock of goods that we saw clearly, by the time of our arrival there, we should be unable either to give a suitable present to the prince, or pay our way afterwards to the south. This alone would not have proved a barrier, for a branch of the Leeambye or Zambesi is reported to flow southwards from a part a few days east of his town, 23° or $24^{\circ} E.$ long. (?), and it would have been of great importance to have discovered water conveyance all the way down to the country of the Makololo. But it is universally asserted and believed that Matiamvo will on no account permit any white man, or even native trader, to pass him in that direction; it is his own principal resort

for ivory. The tribes living there kill many elephants, and bring the ivory to him as tribute. They are called Kanyika and Kanyoka, or Banyika and Banyoka. Having but slender acquaintance with the Londa dialect, we felt that neither pay nor persuasion could be effectively employed to secure permission to follow our object; so we decided on leaving Cabango to proceed south-east to our friend Katema, and thence down the Leeba.

The people among whom we now travelled being Balonda only, we got on very comfortably, except in one instance, in which a chief named Kawawa, who had heard of our treatment by the Cheboque in going north, presumed on his possessing the fords of the Kasai, so far as to demand tribute from the white man. Nothing could exceed the civilities which passed between us on the Sunday of our stay in his town. But when we offered to cross the river he mustered all his forces to compel payment of "a gun, an ox, a man, a barrel of powder, a black coat! or a book which would tell him if Matiamvo had any intention of sending to cut off his head." Unless we had submitted to everything, as the Mambari do, and given a bad precedent for all white men afterwards, we were obliged to part with "daggers drawn." The canoes were all concealed among the reeds, but my men were better sailors than his; and having taken the loan of one by night, in order to show how scrupulously honest we were, we left it and a few beads on their own side of the river, and thanked them next morning for their kindness amidst shouts of laughter.

The route we followed to Katema, being considerably to the east of that by which we went to Loanda, a curious phenomenon, which then escaped our notice, was now discovered, viz. that of the river Lotembwa flowing in two nearly opposite directions. By the tracing sent from Angola, you will see it as if rising in the small lake Dilolo. Such seemed the fact as far as the southern portion of the river is concerned. Our former route having led us to the Kasai, at some distance west of the northern portion, we were not aware of its existence. In returning, however, we were surprised at being obliged to cross the Lotembwa before we reached Lake Dilolo. It was more than a mile broad, three or four feet deep, and full of Arum Egyptiacum, lotus, papyrus, mat-rushes, and other aquatic plants. Not being then informed of the singular fact that it actually flows N.N.W. into the Kasai, I did not observe the current, simply concluding it was a prolongation of the Lotembwa beyond the lake, and that it rose in a long flat marsh, as most of the rivers in this quarter do. But we were positively informed afterwards that the flow was to the Kasai, and not into Dilolo. I have no reason to doubt the correctness of this information. I could not ascertain whether Lake Dilolo gives much water to the northern Lotembwa; but had there been a

current of one-fourth the strength of that which flows into the southern Lotembwa, I must have observed it. It looks like an arm of the lake where I crossed it, and probably flows faster when nearer the Kasai. The southern Lotembwa proceeds from an arm of the lake, half a mile broad, and at the part where most of the water flows it is chin deep. We crossed the river above its confluence with the latter arm, and the great body of flowing, deep water it contained there (from 80 to 100 yards wide) made me suppose that it receives a supply from the northern as well as from the southern end of Dilolo. The fever having there caused vomiting of large quantities of blood, I could not return and examine the curious phenomenon more minutely; but I consider it as almost quite certain that Lake Dilolo divides its waters between the Atlantic and Indian oceans. A portion flows down the Kasai—Zaire, or Congo, and another down the Leeba to the Zambesi. The whole of the adjacent country is exceedingly flat. In coming to the Lotembwa from the north we crossed a plain 24 miles broad, and so level that the rain-water stands on it for months together; and when going north we waded through another plain to the south of the northern Lotembwa, 15 miles broad, with about a foot of water on it, and the lotus flowers in bloom therein.

As the Royal Geographical Society receives geographical information from every quarter, and then acts on the eclectic principle of securing the good and true from the heaps of materials which travellers abroad and loungers at home may send to the crucible, I have, with less diffidence than I should otherwise have felt, resolved to state some ideas which observation and native information have led me to adopt as to the form of the southern part of the continent. It is right to state also distinctly that I am now aware that the same views were clearly expressed in the anniversary speech of 1852, by the gentleman to whom this letter is addressed. Yet having come to nearly the same conclusions about three years afterwards, and by a different route, the reasons which guided my tortoise pace may, though stated in my own way, be accepted as a small contribution to the inferences deduced by you (Sir Roderick Murchison) from the study of the map of Mr. Bain.

In passing northwards to Angola, the presence of large Cape heaths, rhododendrons, Alpine roses, and more especially the sudden descent into the valley of the Quango, near Cassangé, led me to believe we had been travelling on an elevated plateau. I had hopes then of finding an aneroid at Loanda; but having been disappointed in this, from my friend Colonel Steele having gone to the Crimea, I had to resort, on my return, to observations of the temperature of boiling water as a means of measuring elevations. I have no table at hand for reducing degrees into feet,

and will give, therefore, a list of observations only. If you do not reject the instrument altogether, it will be allowed that there is some plausibility, at least, in what follows :—

					Brisk ebullition.	
					°	Feet.
Top of the rocks of Pungo Andongo	204	=	4210			
Top of the ascent of Tala Mungongo	206		3151			
Bottom of same ascent	208		2097			
Bottom of eastern ascent	205		3680			
Top of eastern ascent	202		5278			
Dilolo	203		4741			
Confluence of Leeambye and Leeba	203		4741			
Linyanti	205½		3521			
Lake Ngami	206° or 207	=	206½			2600 to 3151

The highest point in the district of Pungo Andongo is given to show that it is lower than the ridge, which I believe is cut through by the valley of Cassangé, in which the Quango now flows. And the top of the ascent of Tala Mungongo—which, to the eye, looks much higher than the eastern ascent, if we may depend on the point of ebullition as an approximation—is in reality much lower ; indeed not more elevated than Lake Ngami, which is clearly in a hollow. In coming along this elevated land towards the Quango, we were unconsciously near the crest of a large oblong mound, or ridge, which probably extends through 20° of latitude, and gives rise to a remarkable number of rivers : thus, the Quango on the north ; the Coanza on the west ; the Langebongo, which the latest information identifies with the Loeti, and the numerous streams which unite and form the Chobé, on its south-east ; all the feeders of the Kasai and that river itself on the east ; and probably also the Embara or river of Libébé on the south. Yet this elevation is by no means mountainous. The general direction of all these rivers, except the Coanza and Quango, being towards the centre of the continent, with a little northing or southing in addition, according as they belong to the western or eastern main drains of the country, clearly implies the hollow or basin form of that portion of intertropical Africa. The country about Lake Dilolo seems to form a partition in the basin ; hence the contrary directions of its drainage.

Viewing the basin from this (Linyanti) northward, we behold an immense flat, intersected by rivers in almost every direction, and these are not the South-African mud, sand, or stone rivers either, but deep never-failing streams, fit to form invaluable bulwarks against enemies who can neither swim nor manage canoes. They have also numerous departing and re-entering branches, with lagoons and marshes adjacent, so that it is scarcely possible to travel along their banks without the assistance of canoes. We brought two asses as a present from certain merchants in Loanda to Sekelétu,

and as this animal is not injured by the bite of the tsetse, they came as frisky as kids through all the flowing rivers of Londa ; but when we began to descend the Leeambye, dragging them almost hourly through patches of water or lagoons, they were nearly killed, and we were obliged to leave them at Naliele. These valley rivers have generally two beds, one of low water and another of inundation. The period of inundation does not correspond with the rainy season here, but with a period in the north subsequent to that. The flood of the Leeambye occurs in February and March, while that of the Chobe, from its being more tortuous, is a month later. We hear of its being flooded 40 miles above Linyanti, eight or ten days before it overflows there. When these rivers do overflow, then the valley assumes the appearance of being ornamented with chains of lakes. This is probably the geologically recent form which the great basin showed, for all the low-water channels in the flats are cut out of soft calcareous tufa, which the waters of this country formerly deposited most copiously. The country adjacent to the beds of inundation is, except where rocks appear, not elevated more than from 50 to 100 feet above the general level.

That the same formation exists on the eastern side of the country appears from the statements of Arabs or Moors from Zanzibar. They assert that a large branch of the Leeambye flows from the country of the Banyassa (Wun'yassa) to the south-west, and passes near to the town of Cazembé ; it is called Loapola. The Banyassa live on a ridge parallel to the east coast ; and though they have no lake in their own country, they frequently trade to one on their N.N.W. My Arab informants pass this lake on their way back to Zanzibar. It is said to be ten days' north-east of Cazembé, and is called Tanganyenka (Tanganyeinka), and connected with another named Kalágue (Garague?). Both are stated to be so shallow that the canoes are punted the whole way across, and the voyage occupies three days. Will it be too speculative to suppose that these large collections of fresh water are the residue of greater and deeper lakes, just as Lake Ngami is ? the openings in the eastern ridge not being deep enough to drain those parts of the basin entirely.

In a foray made by the Makololo to the country about east of Masiko's territory, during our visit to Loanda, they were accompanied by the Arab Ben Habib, from whom I received much of the above information. This party saw another river than the Loapola, coming from the north-east, with a south-west course, to form a lake named Shuia (Shooea). A river emerges thence, which, dividing, forms the Bashukulompo and Loangwa rivers. There is a connection between these and the Leeambye too, a statement by no means improbable, seeing the country around Shuia (lat.

13°, long. 27° or 28° E.?) is described as abounding in marshes and reedy valleys. When there, the Arab pointed to the eastern ridge, whence the rivers come, and said, "When we see that, we always know we are about to begin the descent of ten or fifteen days to the sea."

I am far from craving implicit faith in those statements, for my informants possess a sad proneness to "amiability," and they will roundly assert whatever they think will please you. For example:—"Are you happy as a slave?" "O, infinitely more so than when I was free;" and then run away from their masters. But my object in making inquiries was unknown; and, when supported by the testimony of the Makololo, the statements may be taken as supporting the view that the central parts of Africa south of the equator, though considerably elevated above the level of the sea, form really a hollow in reference to two oblong ridges on its eastern and western sides. As suggestive of further inquiry only, I may mention, though not pretending to have examined the pretty extensive portions of the country which came under my observation with the eye and deep insight of a geologist, that the general direction of the ranges of hills appears to be parallel to the major axis of the continent. The dip of the strata down towards the centre of the country led to the conclusion, before I knew of the existence of the ridges, that Africa had in its formation been pressed up much more energetically at the sides than at the centre. The force which effected this, I supposed, may have been of the same nature as that which determined most recent volcanoes to be in the vicinity of the sea. This seems to have been the case in Angola at least; and having probably been in operation over a vast extent of coast, decided the very simple littoral outline of Africa. I am induced to make this suggestion because, when the ridges are situated far from the coast, they do not seem to owe their origin to recently erupted rocks. There is a section of the western ridge, near Cassangé, nearly a thousand feet in height; and except a capping of hæmatite mixed with quartz pebbles, it is a mass of the red clay shale termed in Scotland "keel," the thin strata of which are scarcely at all disturbed. (This keel is believed to indicate gold. Had I met with a nugget I would have mounted a mule instead of the ungainly beast I rode.)

I have mentioned the locality of Lake Dilolo as forming a sort of partition in the central valley, but it is not formed by outcropping rocks, as one may travel a month beyond Shinte's without seeing a stone; but in proceeding south of Ngami, the farther we go the greater has been the filling up by eruptive traps. The 25th parallel of latitude divides a part of the valley, containing 1000 feet more filling up than that north of Kolobeng; and, strangely enough, the only instance of a large transported boulder occurs just at the edge of the more hollow part. The plains to

the south of that are elevated perhaps 5000 feet above the level of the sea. But the erupted rocks, as that on which Kuruman stands, have brought up fragments of the very old bottom rocks in their substance.

As I am not aware that the late Dr. Buckland made any public use of a paper which I sent to him in 1843, on the gradual desiccation of the Bechuana country, it may not be improper to mention, in support of the actual drying up of all the rivers which have a westerly course, that I pointed out the bed of a still more ancient river than those trickling rills which now pass by the name. It flowed from north to south, exactly as the Zambesi does now, and ended in a large lake, which must have been discharged when the fissure was made through which the Orange river now flows. At the point of confluence between river and lake some hills of amygdaloid caused an eddy, and in the eddy we have a mound of tufa and travertin full of fossil bones. From these I had hopes of ascertaining the age of the river; but, in addition to my time being much restricted by sacred duties, I had no instrument with me when I discovered these beautiful fossils, which stand out in relief on the rock. On the second occasion I was called off by express to the child of another missionary, and galloped a hundred miles to find him in his grave. To crown all, some epiphyses and teeth, which I sent with specimens to illustrate the geology of the interior, though taken to England by the Rev. H. H. Methuen, were stolen from the railway before reaching Dr. Buckland's hands. As it is not likely that I shall ever visit the spot again, I may mention that the mound is near Bootschap, and well known to the Rev. H. Helmore, who would willingly show it to any one desirous of procuring specimens. They are perfectly fossilised, and about the same size as zebras or buffaloes.

With respect to the spirit in which our efforts have been viewed by the Makololo, I think there is no cause for discouragement. The men of my company worked vigorously while at Loanda, and their savings appeared to them to be considerable, But the long journey back forced us to expend all our goods, and on arriving at the Barotsé we were all equally poor. Our reception and subsequent treatment were, however, most generous and kind. The public reports delivered by my companions were sufficiently flattering to me, and their private opinions must have been in unison, for many volunteers have come forward unasked to go to the east. A fresh party was despatched with ivory for Loanda, and only two days were allowed for preparation. They are under the guidance of the Arab from Zanzibar already alluded to, and the men have no voice in the disposal of the goods; they are simply to look and learn. After my late companions have rested some time, it is intended for them to return as independent traders. This was not my suggestion—indeed I could

scarcely have expected it, for the hunger and fatigue they endured were most trying to men who have abundance of food and leisure at home. But the spirit of trade is strong in the Africans, and they are much elated with the large prices given at Loanda.

If no untoward event interferes, a vigorous trade will certainly be established. The knowledge of the great value of ivory puts a stop to the slave-trade in a very natural way. As our cruizers on the west coast render property in slaves of very small value there, the Mambari, who are generally subjects of Kanguombe of Bihé, purchase slaves for domestic purposes only; but to make such a long journey as that from Bihé to the Batōka country, east of the Makololo, at all profitable, they must secure a tusk or two. These can only be got among certain small tribes who depend chiefly on agriculture for subsistence, and are so destitute of iron that they often use hoes of wood. They may be induced to part with ivory and children for iron implements, but for nothing else. The Mambari tried cloth and beads unsuccessfully, but hoes were irresistible. The Makololo wished to put a stop to their visits by force, but a hint to purchase all the ivory with hoes was so promptly responded to, that I anticipate small trade for the Mambari in future. If any one among the tribes subject to the Makololo sells a child now, it is done secretly. The trade may thus be said to be pretty well repressed. A great deal more than this, however, is needed. Commerce is a most important aid to civilization, for it soon breaks up the sullen isolation of heathenism, and makes men feel their mutual dependence. Hopes of this make one feel gratified at the success which has attended my little beginning. But it is our blessed Christianity alone which can touch the centre of the wants of Africa. The Arabs, it is well known, are great in commerce, but not much elevated thereby above the African in principle. My Arab friend Ben Habib, now gone to Loanda, was received most hospitably by an old female chief called Sebola Mokwaia; and she actually gave him ivory enough to set him up as a trader; yet he went with the Makololo against her to revenge some old feud with which he had no connexion.

DAVID LIVINGSTONE.

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2. *From Linyanti to the Falls of Victoria (Mosioatunya), thence across the hills to the Confluence of the Zambesi and Kafué Rivers, and along the Zambesi to Teté. With Remarks on the Structure of the South-eastern Part of the African Continent.*

Hill Chanyuné, on the banks of the Zambesi,
25th January, 1856.

SIR,—As we are now within a few days of the Portuguese station called Teté, I shall begin preparations for entering the world

again by giving you a sketch of our progress thus far while my men are engaged in paddling each other across this broad river. No. 1 was written while waiting for rains at Linyanti, and refers chiefly to the country north of that point; and this No. 2 is intended as a sort of continuation, but directed principally to the eastern side of the continent.

When passing Seshéke in our way down the river in November last, the chief Sekelétu generously presented ten slaughter-cattle and three of the best riding oxen he could purchase among his people, together with supplies of meal and everything else he could think of for my comfort during the journey. Hoes and beads were also supplied to purchase a canoe, when we should come to the Zambesi again, beyond the part where it is constricted by the rocks. These acts of kindness were probably in part prompted by the principal men of the tribe, and are valuable as showing the light in which our efforts are viewed; but as little acts often show character more clearly than great ones, I may mention that—having been obliged to separate from the people who had our luggage, and to traverse about 20 miles infested by the tsetsé during the night—it became so pitchy dark, we could only see by the frequent gleams of lightning, which at times revealed the attendants wandering hither and thither in the forest. The horses trembled and groaned, and after being thoroughly drenched by heavy rain we were obliged to give up the attempt to go farther, and crawled under a tree for shelter. After the excessive heat of the day one is peculiarly sensitive to cold at night. The chief's blanket had fortunately not gone on; he covered me with it, and rested himself on the cold, wet ground until the morning. If such men must perish before the white race by an immutable law of Heaven, we must seem to be under the same sort of "terrible necessity" in our "Caffre wars" as the American professor of chemistry said he was when he dismembered the man whom he murdered.

Our convoy down to Mosioatunya consisted of the chief and about 200 followers. About 10 miles below the confluence of the Chobé and Leeambye or Zambesi, we came to the commencement of the rapids. Leaving the canoes there, we marched on foot about 20 miles further, along the left or northern bank, to Kalai, otherwise called the island of Sekoté. It was decided by those who knew the country well in front, that we should here leave the river, and avoid the hills through which it flows, both on account of tsetsé and the extreme ruggedness of the path. By taking a north-east course the river would be met where it has become placid again. Before leaving this part of the river I took a canoe at Kalai, and sailed down to look at the falls of Mosioatunya, which proved to be the finest sight I have seen in Africa. The

distance to the "Smoke-sounding" Falls of the Zambesi was about 8 miles in a S.S.E. direction, but when we came within 5 miles of the spot we saw five large columns of "smoke" ascending 200 or 300 feet, and exhibiting exactly the appearance which occurs on extensive grass-burnings in Africa. The river above the falls is very broad, but I am such a miserable judge of distances on water that I fear to estimate its breadth. I once showed a naval officer a space in the bay of Loanda which seemed of equal breadth with parts of the river which I have always called 400 yards. He replied, "That is 900 yards." Here I think I am safe in saying it is at least 1000 yards wide. You cannot imagine the glorious loveliness of the scene from anything in England. The "Falls," if we may so term a river leaping into a sort of strait-jacket, are bounded on three sides by forest-covered ridges about 400 feet in height. Numerous islands are dotted over the river above the falls, and both banks and islands are adorned with sylvan vegetation of great variety of colour and form. At the period of our visit many of the trees were spangled over with blossoms, and towering above them all stands the great burly baobab, each of whose (syenite-coloured) arms would form the bole of a large ordinary tree. Groups of graceful palms, with their feathery-formed foliage, contribute to the beauty of the islands. As a hieroglyphic, they always mean "far from home;" for one can never get over their foreign aspect in picture or landscape. Trees of the oak shape and other familiar forms stand side by side with the silvery Mohonono, which in the tropics looks like the cedar of Lebanon. The dark cypress-shaped Motsouri, laden with its pleasant scarlet fruit, and many others, also attain individuality among the great rounded masses of tropical forest. We look and look again, and hope that scenes lovely enough to arrest the gaze of angels may never vanish from the memory. A light canoe, and men well acquainted with the still water caused by the islands, brought us to an islet situated in the middle of the river and forming the edge of the lip over which the water rolls. Creeping to the verge, we peer down into a large rent which has been made from bank to bank of the broad Zambesi, and there we see the stream of a thousand yards in breadth suddenly compressed into a channel of fifteen or twenty. Imagine the Thames filled with low tree-covered hills from the Tunnel to Gravesend, its bed of hard basaltic rock instead of London mud, and a rent or fissure made in the bed, from one end of the tunnel to the other, down through the keystones of the arch, to a depth of 100 feet, the lips of the fissure being from 60 to 80 feet apart. Suppose farther, the narrow rent prolonged from the Tunnel to Gravesend along the left bank, and the Thames leaping bodily into this gulf, compressed into 15 or 20 yards at the bottom,

forced to change its direction from the right to the left bank, then turning a corner and boiling and roaring through the hills, and you may conceive something similar to this part of the Zambesi.

The river is reported to rush through the rent about 30 miles in an E.S.E. direction, and when free from its place of confinement it flows placidly again towards the north-east, till it reaches the latitude of $15^{\circ} 37' S.$ The falls, of which I am now writing, are in $17^{\circ} 57' S.$ lat. The side of the fissure opposite to that over which the river falls is quite perpendicular and has a straight edge, except at the left-hand corner, where a rent is visible and a piece seems inclined to fall off. It is composed of one unstratified basaltic rock. The side over which the river precipitates itself is perpendicular too; but in three of the five or six parts into which the stream is divided at low-water, about 3 feet of the edge of the lip is bevelled off. Several pieces also having fallen in give this lip a serrated edge; but the water falls at once clear of the rock and becomes a fleecy mass as white as snow. The pieces of water, if I may so express myself, do not at once lose their cohesion, but give off streams of vapour, in their downward course, exactly as comets are represented on paper, or as a piece of steel when burned in oxygen gas. The beautiful mass thus resembles a thousand comets speeding on their course. On looking down into the fissure on the right of the island, where the largest quantity of water falls, nothing is seen but a dense white cloud with two bright rainbows on it. (It was about mid-day and the declination of the sun nearly the same as the latitude when we visited it.) An immense stream of vapour rushes up from the cloud unlike anything I ever saw before. When about 300 feet high it loses its steam colour, becomes dark, and descends in a shower, exposure to which for a quarter of an hour wetted us to the skin. A few yards back from the opposite lip a dense unbroken hedge of ever-green trees stands. Their leaves are constantly wet from the condensed vapour, and from their roots several little rills run back into the gulf, but never reach the bottom, for the ascending columns of vapour literally lick them up off the perpendicular wall before they are half-way down. I have estimated the depth at 100 feet, but we cannot see what it is on the right of the island. On the left of the island a large piece has fallen in, and that lying on one side of the chafing river below enables me to form an approximation: my companions amused themselves by throwing stones down the falls, and wondering to see how small they became before they were lost in the cloud. In former days the three principal falls were used as places where certain chiefs worshipped the Barimo (gods or departed spirits). As even at low water there are from 400 to 600 yards of water pouring over, the constancy and loudness of the sound may have produced feelings of

awe, as if the never-ceasing flood came forth from the footstool of the Eternal. It was mysterious to them, for one of their canoe songs says,

“The Liambai,—nobody knows
Whence it comes or whither it goes.”

Perhaps the bow in the cloud reminded them of Him who alone is unchangeable and above all changing things. But, not aware of his true character, they had no admiration of the beautiful and good in their bosoms. Secure in their own island fortresses, they often inveigled wandering or fugitive tribes on to others which are uninhabited, and left them there to perish. The river is so broad, that, when being ferried across, you often cannot see whether you are going to the main land or not. To remove temptation out of the way of our friends, we drew the borrowed canoes last night into our midst on the island where we slept, and some of the men made their beds in them. I counted between fifty and sixty human skulls mounted on poles in a village near Kalai, being those of men slain when famishing with hunger; and I felt thankful that Sebituane had rooted out the bloody imperious “Lords of the Isles.”

That trade has never extended thus far from either the east or western coasts, is, I believe, extremely probable from the grave of the elder Sekoté being still seen on Kalai Island, ornamented with seventy large elephant's tusks planted round it, and there are about thirty tusks over the resting-places of his relatives. Indeed, ivory was used only to form the armlets and grave-stones of the rich, and it is now met with in a rotten state all over the Batōka country. This fact I take as corroborative of the universal assertion, that no trader ever visited the country previous to the first and unsuccessful attempt of the Mambari to establish the slave-trade with Santuru, the last chief of the Barotsé.

Before concluding this account of the falls, it may be added that the rent is reported to be much deeper farther down, perhaps 200 or 300 feet; and at one part the slope downwards allows of persons descending in a sitting posture. Some Makololo, once chasing fugitives, saw them unable to restrain their flight, and dashed to pieces at the bottom. They say the river appeared as a white cord at the bottom of an abyss, which made them giddy and fain to leave. Yet I could not detect any evidence of wear at the spot which was examined, though it was low water, and from seven to ten feet of yellow discolouration on the rock showed the probable amount of rise. I have been led to the supposition by the phenomena noticed by both Captain Tuckey and Commander Bedingfield in the Congo or Zaire, that it, as well as the Orange River, seems to be discharged by a fissure through the western

ridge. The breadth of the channel among the hills, where Captain Tuckey turned, will scarcely account for the enormous body of water which appears farther down. Indeed, no sounding can be taken with ordinary lines near the mouth, though the water runs strongly and is perfectly fresh.

On the day following my first visit I returned to take another glance and make a little nursery-garden on the island; for I observed that it was covered with trees, many of which I have seen nowhere else; and as the wind often wafted a little condensed vapour over the whole, it struck me this was the very thing I could never get my Makololo friends to do. My trees have always perished by being forgotten during droughts; so I planted here a lot of peach and apricot stones and coffee-seed. As the island is unapproachable when the river rises, except by hippopotami, if my hedge is made according to contract, I have great hopes of Mosioatunya's ability as a nurseryman. On another island close by, your address of 1852 remained a whole year. If you had been a lawyer, instead of a geologist, your claims to the discovery would have been strong, as "a bit of your mind" was within sight and sound of the falls very long before the arrival of any European. I thank you for sending it.

The former name of the spot was Shongwé, the meaning of which I cannot ascertain. The Makololo, in passing near it, said, "Mosi oa tunya," "smoke does sound." Very few of them ever went near to examine the cause before my visit. When the river is in flood, the vapour is seen and the sound heard ten or more miles distant. Although I have not felt at liberty to act on my conviction on the subject of names, I think all rivers and hills discovered by Englishmen ought to have English names. The African name is known only to people in the locality. I could not get the name Zumbo lately from the people among the ruins, and passed Dambarari on the opposite side of the river, nobody having ever heard the name before. The same would have happened of course had they been English or Portuguese names, but we should not have the nonsense with which, by misspelling, we and the printers disfigure the maps. See how many ways Bechuanas are mentioned—Booshuanas, Bootjouanas, Bertjouanas, &c.: Makrakka for Makabé; Marelata for Moretlé; Wanketzeens for Bangwaketse; Beza (God) for Reza. We on the spot are often misled by getting information from (native) foreigners, who pronounce names according to their own dialects, and are thereby often guilty of leading those at home astray. English names too are surely better than the round of Dutch names,—“sand,” “stone,” “mud,” or “reed” rivers. I do not urge the point, but I think it merits consideration.

Shaping our course now to the north-east, we left the hills which

confine the river on our right. When we got free of tsetse and night-travelling, we found a fine open country with gently undulating lawns, ornamented with large spreading trees, which had once given shade in towns and villages, the ruins of which are everywhere visible. There are also many patches of forest, but, as it often happens in this country, the wood grows chiefly on the hills. The large game has now undisturbed occupation of what were the pleasant haunts of men, and immense herds of buffaloes quietly grazing or reclining added to the beauty of the scene.

The sources of the rivulets, which have all a mountain-torrent character, as well as the temperature of the boiling water, showed that we were now ascending the eastern ridge. The first stream is named Lekoné, and is perennial. It runs in what may have been the ancient bed of the Zambesi, before the fissure was made. I could examine it only by the light of the moon, but then it seemed very like an ancient river channel. The Lekoné runs contrary to the direction in which the Zambesi did and does now flow, and joins the latter five or six miles above Kalai. If little or no alteration of level occurred when the fissure was formed, then, the altitude of the former channel being only a little higher than Linyanti, we have a confirmation of what is otherwise clearly evident, that the Zambesi was collected into a vast lake, which included not only Lake Ngami in its bosom, but spread westwards beyond Libelé, southwards and eastwards beyond Nchokotsa. Indeed, in many parts south of Ngami, when an anteater makes a burrow, he digs up shells identical with those of mollusca now living in the Zambesi. And all the surface indicated is covered by a deposit of soft calcareous tufa, with which the fresh waters of the valley seem to have formerly been loaded. The Barotsé valley was probably discharged by the same means; for Gonyé possesses a fissure character, and so does another large cataract situated beyond Masiko in the Kabompo.

It would be interesting to ascertain if these rents were suddenly made and remain in their original state, or whether they are at present progressive. I had a strong desire to measure a point of that of Mosioatunya, but had neither the means of accurate measurement, nor of marking the hard rock afterwards. They have proved drains on a gigantic scale; and if geologists did not require such eternities of time for their operations, we might hazard a hint about a salubrious millenium for Africa.

Shall we say that they are geologically recent, because there is not more than 3 feet worn off the edge subjected to the wear of the water? and that they are progressive, as the gradual desiccation of the Bechuana country shows a slow elevation of the ridges? No one will probably think much of the negative fact, that there is no trace of a tradition in the country of an

earthquake. The word is not in the language; and though events centuries old are sometimes commemorated by means of names, I never met with any approach to a Tom Earthquake or Sam Shake-the-ground among them. Yet they do possess a tradition which is wonderfully like the building of the Tower of Babel, ending differently, however, from that in the Bible, the bold builders having got their heads cracked by the giving way of the scaffolding. There is also the story of Solomon and the harlots; and all trace back their origin to a time when their forefathers came out of a cave in the north-east in company with animals. The cave is termed Loé (Noé?), and is exceptional in the language, from having masculine pronouns.

Still ascending the western side of the ridge, we cross another rivulet named Unguesi, which flows in the same direction as Lekoné, and joins the Zambesi above the point where the rapids begin. The next tributary, called Kalomo, never dries; and being on the top of the ridge, runs south, or south and by east, falling into the Zambesi below the falls. Lastly, we crossed the Mozuma, or Dela, flowing eastwards. We continued the eastern descent till we came to the Bashukulompo River, where it may be said to terminate, for we had again reached the altitude of Linyanti. We intended to have struck the Zambesi exactly at the confluence, but we were drawn aside by a wish to visit Semalembué, who is an influential chief in that quarter. The Bashukulompo River is here called Kahowhé, and farther down it is named Kafué. Passing through some ranges of hills, among which the Kafué winds, we came to the Zambesi, a little beyond the confluence. It is here much broader than that part of it called Leeambye, but possesses the same character of reedy islands, sandbanks, and wonderful abundance of animal life. It was much discoloured by recent rains; but as we came down along the left bank, it fell more than 2 feet before we had gone 30 miles. It is never discoloured above Mosioatunya. Hence I conclude the increase or flood was comparatively local, and effected by numerous small feeders on both banks east of the ridge. When we ascended the Zambesi, towards Kabompo, in January, 1854, the annual flood which causes inundation had begun, and with the exception of sand, which was immediately deposited at the bottom of the vessel, there was no discolouration. Ranges of hills stand on both banks as far as we have yet seen it. The usual mode of travelling is by canoe, so there are generally no paths, and nothing can exceed the tedium of winding along through tangled jungle without something of the sort. We cannot make more than 2 miles an hour; our oxen are all dead of tsetse, except two, and the only riding ox is so weak from the same cause as to be useless. Yet we are more healthy than in the journey

to Loanda. The banks feel hot and steamy both night and day, but I have had no attack of fever through the whole journey. I attribute this partly to not having been "too old to learn," and partly to having had wheaten bread all the way from the waggon at Linyanti. In going north we braved the rains, unless they were continuous; and the lower half of the body was wetted two or three times every day by crossing streams. But now, when rain approaches, we halt, light large fires, and each gets up a little grass shed over him. Tropical rains run through everything, but, though wetted, comparatively little caloric is lost now to what would be the case if a stream of water ran for an hour along the body. After being warmed by the fire, all go on comfortably again, and the party has been remarkably healthy. In the other journey, too, wishing to avoid overloading the men, and thereby make them lose heart, I depended chiefly on native food, which is almost pure starch, and the complete change of diet must have made me more susceptible of fever. But now, by an extemporaneous oven formed by inverting a pot over hot coals, and making a fire above it, with fresh bread and coffee in Arab fashion, I get on most comfortably. There is no tiring of it. I mention this because it may prove a useful hint to travellers who may think they will gain by braving hunger or wet.

From the longitudes, I estimate the distance from top to top of the ridges to be about 600 geographical miles. I purposely refrain from mentioning any of my own calculations of lunar observations, because it would appear so presumptuous to allow them to appear on the same page with those of Mr. Maclear, who, moreover, undertakes the labour with such hearty goodwill, that I fear the appearance even of undervaluing his disinterested aid.

The eastern ridge seems to bend in to the west at the part we have crossed, and then trends away to the north-east, thereby approaching the east coast. It is fringed on some parts by ranges of hills, but my observations seem to show they are not of greater altitude than the flats of Linyanti. I cannot hear of a hill *on* either ridge, hence the agricultural phrase I employ. And if the space between the ridges is generally not broader than 600 miles, instead of calling the continent basin-shaped, it may be proper to say that it has a furrow in the middle, with an elevated ridge on each side, each about 150 or 200 miles broad, the land sloping on both sides thence to the sea.

I have referred to the clay-shale, or "keel" formation, of which I got a glance in the western ridge. In the eastern we have a number of igneous rocks, with gneiss and mica-slate, all dipping westwards; then large rounded masses of granite, which appear to change the dip to the eastward. I bring specimens of

both classes of rocks along with me. Is this granite the cause of elevation?

I shall refer to but one topic more and then conclude. The ridges are both known to be comparatively salubrious, closely resembling in this respect that most healthy of healthy climates, the interior of Southern Africa, adjacent to the desert. The grass is short; one can walk on it without that high, fatiguing lift of the foot necessary among the long tangled herbage of the valley. We saw neither fountain nor marsh on it; and, singularly enough, we noticed many of the plants and trees which we had observed on the slopes of the western ridge. In Angola, parts—which once were thought to be so unhealthy as to be set apart for the punishment of criminals of the deepest dye, and transportation there deemed much worse than to any part of the coast—are now known to be the most healthy spots in the country. Such are the “*pedras negras*,” or black rocks of Pungo Andongo, and other parts.

If my opinion were of any weight, I would fain recommend all visitors of the interior of Africa, whether for the advancement of scientific knowledge, or for the purposes of trade or benevolence, to endeavour to ascertain whether the elevated salubrious ridges mentioned are not prolonged farther north than my inquiries extend, and whether sanatoria may not be established on them. At present I have the prospect of water-carriage right up to the bottom of the eastern ridge. If a quick passage can be effected thither during a healthy part of the season, there is, I presume, a prospect of residence in localities superior to those on the coast. Did the Niger expedition turn back when near such a desirable position for its stricken and prostrate members?

I have said that the hills which fringe the ridge on the east are not of great altitude. They are all lower than the crest of the ridges, and bear evident marks of having been subjected to denudation on a grand scale. Many of the ranges show on their sides, in a magnified way, the exact counterparts of mud-banks left by the tides. A coarse sandstone rock which contains banks of shingle and pebbles, but no fossils, often exhibits circular holes, identical with those made by round stones in rapids and waterfalls. They are from 3 to 4 feet broad at the brim; wider internally, and 6 or 8 feet deep. Some are convenient wells, others are filled with earth; but there is no agency now in operation in the heights in which they appear which could have formed them. Close to the confluence of the Kafue there is a forest of silicified trees, many of which are 5 feet in diameter; and all along the Zambesi to this place, where the rock appears, fragments of silicified wood abound. I got a piece of palm, the pores filled with silica, and the woody parts with oxide of iron. I imagined it was

one of the old bottom rocks, because I never could see a fossil in it in the valley; but here (Tete and Naké Rt.) I find it overlying beds of coal! If it be not heresy for a mere learner to utter an opinion, I would suggest, from the bending in of the ridge, and the appearance of the country eastwards, that in ancient times this continent presented very much of the same bent form as the south-eastern coast of America does now.

DAVID LIVINGSTONE.

Temperature of the Average Point of
brisk Ebullition.

	°	Feet.
Linyanti	205 $\frac{1}{3}$	3288
Bed of Lekoné River	204 $\frac{1}{2}$	4078
Marimba's village	203 $\frac{1}{4}$	4608
Unguesi River	202 $\frac{1}{2}$	
Kalomo River	202	5278
Naka Chinto, on eastern slope	204	4210
Semalembue's, on Kafué River	205 $\frac{1}{2}$	3415
Top of hill at Semalembue's	204 $\frac{1}{2}$	4078
Down at bed of river 1 hour afterwards	205 $\frac{3}{4}$	3288
Near confluence of Kafué and Zambesi	209	1571
Confluence of Loangwa and Zambesi = Zumbo	209 $\frac{1}{4}$	1440

Note.—The observations were generally made at the same hour of the day, and when the temperature of the air in the shade was about 80°.—D. L.

3. On the People of Southern Africa, with concluding Remarks.

Teté or Nyungwé, River Zambesi, Africa,
4th March, 1856.

SIR,—Having arranged for the delay of the messenger for half a day more, I shall spend the time on this portion of my communication referring principally to the people of this part of Africa.

Perhaps nowhere else do hills seem to exert a more powerful and well-marked influence on national character than they do in Africa. Every one is aware of the brave resistance offered by the Caffre mountaineers to the British soldiers, than whom I believe there are none more brave beneath the sun. And the whole of the hill tribes, with but few exceptions, possess a similarity of character. They extend chiefly along the eastern side of the continent. Those among whom I have lately travelled have been fighting with the Portuguese for the last two years, and have actually kept the good men of Teté shut up in their fort during most of that time. They are a strong, muscular race, and, from constant work in the gardens, the men have hands like those of English ploughmen. Like hill people in general, they are much attached to the soil. Their laws are very stringent. The boundaries of the

lands of each are well defined, and, should an elephant be killed, the huntsman must wait till one comes from the lord of the land to give permission to cut it up. The underlying tusk and half of the carcase are likewise the property of him on whose soil the elephant fell. They may well love their land, for it yields abundance of grain, and here superior wheat and rice may be seen flourishing side by side. Their government is a sort of republican-feudalism, which has decided that no child of a chief can succeed his father. A system of separating the young men from their parents and relatives would have pleased the author of the *Cyropædia*: yet the frequent application of the ordeal to get rid of a wife no longer loved shows that Xenophon's beau idéal does not produce gallantry equal to that which emanates from the birth of a wrathful village dominie among ourselves. The country towards Mosambique supports people of similar warlike propensities; and if these are owing to an infusion of Arab blood in their veins, that mixture does not seem to have had much influence on their customs, for those are more negro than aught else. They all possess a very vivid impression of the agency of unseen spirits in human affairs, which I believe is especially characteristic of the true negro family.

Situated more towards the centre of the continent, we have the Bechuana tribes, who live generally on plains. Compared with the Caffre family, they are all effeminate and cowardly; yet even here we see courage manifested by those who inhabit a hill country. Witness, for example, Sebituane, who fought his way from the Basuto country to the Barotsé and to the Bashukulompo. Moshesh showed the same spirit lately in his encounter with English troops. These stand highest in the scale, and certain poor Bechuanas, named Bakalahari, are the lowest. The latter live on the desert, and some of their little villages extend down the Limpopo. They generally attach themselves to influential men in the Bechuana towns, who furnish them with dogs, spears, and tobacco, and in return receive the skins of such animals as they may kill either with the dogs or by means of pitfalls. They are all fond of agriculture, and some possess a few goats; but the generally hard fare which they endure makes them the most miserable objects to be met with in Africa. From the descriptions given in books, I imagine the thin legs and arms, large abdomens, and the lustreless eyes of their children, make the Bakalahari the counterparts of Australians.

Considerable confusion has been introduced in consequence of the indiscriminate use of the term "Caffre." It is an instance in which the use of a single word involves a very free use of the traveller's licence, for does it not appear presumptuous to speak of hunting, travelling, and sometimes talking big among thousands of

“Caffres,”—those “magnificent savages,” to wage war with whom Sir Harry Smith declared was like fighting with Circassians or Algerine Arabs? I never can repress a smile when Boers or Englishmen speak of the more abject of the Bechuanas as “Caffres.” The real Caffres or Zulu race are those who have banged about the English soldier so uncereemoniously, and are as remarkable as New Zealanders for suffering no nonsense from either white or brown. This difference in national character explains at a glance why the tide of emigration spreads away from Caffreland towards the more central parts—in the Sovereignty and Cashan mountains. Oddly enough, among the very first articles of the political government of a republic on the plains is a law made for the punishment of cowardice! They, of course, know their own wants best.

But though it is all very well, in speaking in a loose way, to ascribe the development of national character to the physical features of the country, I suspect that those who are accustomed to curb the imagination in the severe way employed to test for truth in the physical sciences would attribute more to race or breed than to mere scenery. Look at the Bushmen—living on the same plains, eating the same food, but often in scantier measure, and subjected to the same climatorial and physical influences as the Bakalahari, yet how enormously different the results! The Bushman has a wiry, compact frame; is brave and independent; scorns to till the ground or keep domestic animals. The Bakalahari is spiritless and abject in demeanour and thought, delights in cultivating a little corn or pumpkins, or in rearing a few goats. Both races have been looking at the same scenes for centuries. Two or three Bechuanas from the towns enter the villages of the Bakalahari and pillage them of all their skins of animals without resistance. If by chance the Bechuanas stumble on a hamlet of Bushmen, they speak softly, and readily deliver up any tobacco they may have as a peace-offering, in dread of the poisoned arrow which may decide whether they spoke truly in saying they had none.

Again, look at the river Zouga, running through a part of the Bushman and Bakalahari desert. The Bayeiye or Bakoba live on its reedy islets, cultivate gardens, rear goats, fish and hunt alternately, and are generally possessed of considerable muscular development. Wherever you meet them they are always the same. They are the Quakers of the body politic in Africa. They never fought with any one, but invariably submitted to whoever conquered the lands adjacent to their rivers. They say their progenitors made bows of the castor-oil plant, and they broke; “*therefore* (!) they resolved never to fight any more.” They never acquire much property, for every one turns aside into their

villages to eat what he can find. I have been in their canoes and found the pots boiling briskly until we came near to the villages. Having dined, we then entered with the pots empty, and looking quite innocently on any strangers who happened to drop in to dinner. Contrast these Friends with the lords of the isles, Sekote and others, living among identical circumstances, and ornamenting their dwellings with human skulls.

The cause of the difference observed in tribes inhabiting the same localities, though it spoils the poetry of the thing, consists in certain spots being the choice of the race or family. So when we see certain characters assembled on particular spots, it may be more precise to say we see the antecedent disposition manifested in the selection, rather than that the part chosen produced a subsequent disposition. This may be evident when I say that, in the case of the Bakalahari and Bushmen, we have instances of compulsion and choice. The Bakalahari were the first body of Bechuana emigrants who came into the country. They possessed large herds of very long-horned cattle, the remains of which are now at Ngami. A second migration of Bechuanas deprived them of their cattle and drove them into the desert. They still cleave most tenaciously to the tastes of their race. While, for the Bushman, the desert is his choice, and ever has been from near the Coanza to the Cape. When we see a choice fallen on mountains, it means only that the race meant to defend itself. Their progenitors recognised the principle, acknowledged universally, except when Caffre police or Hottentots rebel, viz. that none deserve liberty except those who are willing to fight for it. This principle gathers strength from locality, tradition develops it more and more, yet still I think the principle was first, foremost, and alone vital.

In reference to the origin of all these tribes, I feel fully convinced, from the very great similarity in all their dialects, that they are essentially one race of men: the structure, or we may say the skeletons, of the dialects of Caffre, Bechuana, Bayeiye, Barotse, Batoka, Batonga or people of the Zambesi, Mashona, Babisa, the negroes of Londa, Angola, and people on the west coast, are all wonderfully alike. A great proportion of the roots is identical in all.

The Bushman tongue seems an exception, but this, from the little I can collect of it, is more apparent than real. While all the others are developed in one and nearly the same direction, this deviates into a series of remarkable clicks. The syllable on which, in other dialects, the chief emphasis is put, in this sometimes constitutes the whole word. But though the variations lie in clicks, the development is greater than in the other dialects. They have, for instance, the singular, plural, and dual numbers;

the masculine, feminine, and neuter genders ; and the aōrist tense ; which the others have not.

It may be gratifying for you to hear that the Bible is nearly all translated into Sichuana—the dialect of the Bechuanas, and the most regularly developed of all negro languages. Of its capabilities you may judge, when I mention that the Pentateuch is fully expressed in considerably fewer words than in the Greek Septuagint, and in a very large number less than in our verbose English. Of its copiousness I cannot well speak, for I have been learning it for fifteen years, and others have been doing so for double that time, and we hear new words every day or two. It is fortunate so many are now secured ; and others not in the language, or in any language, till the ideas are taken from the sacred oracles, are adopted into the language ; for, people born in the country, though they speak it without foreign accent, and even natives in contact with Europeans, are remarkable for the scantiness of their vocabularies.

In the animal kingdom there are three antelopes which, I believe, have been hitherto unknown, all of which abound in the great valley, but nowhere else. One is specially adapted for treading on mud and marshy spots, by great length from point of toe to the little hoofs above the fetlock. It has a heavy gait, looks paunchy, and hides itself all but the nose in water. I wished to name it after Captain Vardon, my warm friend, and a participator in discovery in Africa, but I could not bring any skin for want of tin boxes. Tropical rains go through everything else. Will the Zoological Society gratify me in this ? I will send it when I can. Its native name is Nakong or Setutunka.

Another little antelope abounds in great numbers near Seshéke ; its cry of alarm is like that of the domestic fowl. It is called Thianyané. The third is named Poku, and it abounds in prodigious numbers above the Barotse. It is exactly like the Leche which was discovered when we went first to Lake Ngami, but considerably smaller in every way, and of a redder colour. It seems to be an instance of the application of the law which has determined larger development for animals in the more temperate and colder parts of the continent, than in the hot equatorial regions, where food abounds in lavish profusion. This is different from Mr. Bachman's theory, but I have no doubt as to the existence of the law. A full-grown elephant here, for instance, measures quite two feet less than a similar animal does on the Limpopo or at Kolobeng, though the smaller animal carries the largest ivory.

I never before saw elephants so numerous or so tame as at the confluence of the Kafue and Zambesi. Buffaloes, zebras, pigs,

and hippopotami, were equally so, and it seemed as if we had got back to the time when megatheriæ roamed about undisturbed by man. We had to shout to them to get out of the way, and then their second thoughts were—"It's a trick," "We're surrounded"—and back they came, tearing through our long-extended line. Lions and hyænas are so numerous that all the huts in the gardens are built on trees, and the people never go half a mile into the woods alone. One of our best men ran off, we believe, in a fit of insanity during the night, and we never found a trace of him.

We have no reason to complain of the treatment we have met on the Zambesi. The inhabitants have plenty of grain, and were never stingy with it. Had it been otherwise we should have starved. If spared to return I will pay *them* again, and not as those do who publish in their books that they gave "three buttons," or a "cotton handkerchief," in return for handsome presents of food. They believed our statements of everything being expended until close to Teté, and as they levy tribute on traders we found great difficulty in getting along. Are they worse thus, only where they know us Christians best? We do not seem to convey a favourable idea of our blessed Christianity to the heathen. Do we?

With respect to the perpetuity of the African race, we have a stronger hope than in the case of the South Sea Islanders, and other savage nations in contact with Europeans. The well-known preference that fever manifests for the natives of Northern Europe, and the indisposition it exhibits to make victims of Africans, would lead persons resident in one region of this continent to say that the white race was doomed to extinction. However to be explained, the Africans who have come under my observation are not subject to many of the diseases which thin our own numbers. Smallpox and measles paid a passing visit through the continent some thirty years ago; and though they committed great ravages, they did not remain endemic nor return. They did not find a congenial soil; and though the period preceding the rains is eminently epidemic in its constitution, excepting hooping cough, no epidemic known in Europe appears. That there is an indisposition independent of climatic influences, becomes, I imagine, evident, when the venereal disease is observed to die out spontaneously in Africans of pure blood; and those of mixed blood are subjected to all its forms with a virulence exactly proportioned to the amount of European blood in their veins.

Tending in the same way as this indisposition to diseases which decimate tribes which are passing away, is the fact that the Africans are wonderfully prolific. The Bushmen are equally so, but the Bechuanas are an exception which the introduction of

Christianity may remove. As this has not, it is reported, happened in the Pacific, the data on which our hopes are founded may prove deceptive.

My present party amounts to 110 or 112, and I have taken ivory enough to purchase a long list of articles for Sekelétu. I could scarcely do less in return for all his kindness to me, and it will be initiating his people into trade at the same time. I expect to find employment for the men when nearer the sea, in order that they may support themselves and save a little for their return during my absence in England. The prospect of coming down to trade in canoes is to them so feasible that all are delighted with it. I have not seen a rapid which would delay the Makololo a day. Had I not been obliged to part with the price of the canoe I should have examined all minutely. At present I am indulging the belief that we have water carriage all the way to the foot of the eastern ridge, and should the Makololo come nearer we shall not be quite so much out of the world as we have been.

It may be proper to refer to what has been done in former times in the way of crossing the continent, though my inquiries lead to the belief that the honour belongs to our country. The Portuguese invariably applaud any little ebullition of patriotic feeling they observe in me, and I cannot but participate in their feelings, when in the history of Angola proud mention is made of the brave attempt of Captain José da Roza, in 1678, to penetrate from Benguela to the Rio da Senna (Zambesi). He was forced to retire after exploring a large tract of new country. In 1800 the project was again revived by the energetic Dr. Lacerda, who recommended the erection of a chain of forts along the banks of the Coanza, whereby to effect a line of communication between the west and east coasts. This showed a mistaken idea of the source of the Coanza, as it arises near Bihé, west of the western ridge. But a communication having been made a few years afterwards by some native traders with the Moluas (Balonda), the government of Angola was gratified in 1815 by the arrival of two persons (*feirantes pretos*), named Pedro Joo Baptista and Antonio José, with letters from the governor of Mosambique, "proving thereby," as stated in the government document of the day, "the possibility of so important a communication." Certain Arabs too, a few years before my visit to Loanda, came from the opposite coast to Benguela, and with a view to improve the event the government of Angola offered one million of reis (about 142*l.*), and an honorary captaincy in the Portuguese army, to any one who would accompany them back, but no one went. The journey will now be performed by Ben Habib. Pereira, and others, visited Cazembe, and Senhor Graça visited Matiamvo. If I knew that

any one else had done more, or that any *European* had ever before crossed the continent, I would certainly mention it.* I cannot find a trace of a road from Caconda either.

I feel most thankful to God, who has prolonged my life, while so many who would have done more good have been cut off. But I am not so much elated as might have been expected, for the end of the geographical feat is but the beginning of the missionary enterprise. Geographers labouring to make men better acquainted with each other, soldiers fighting against oppression, and sailors rescuing captives in deadly climes—are all, as well as missionaries, aiding in hastening on a glorious consummation of all God's dealings to man. In the hope that I may yet be permitted to do some good to this poor long trodden-down Africa, the gentlemen over whom you have the honour to preside will, I doubt not, all cordially join.

DAVID LIVINGSTONE.

4. *On the lower Part of Zambesi.*

Quilimane, East Africa, 23rd May, 1856.

SIR,—A packet of letters sent from Teté to the care of Mr. Maclear contained some information addressed to you respecting this noble Zambesi, towards the interior. As I remained six weeks with the excellent commandant, Major T. A. d' A. Secard, who generously advised me thus to avoid the delta at Quilimane until the commencement of the healthy season in April, I had an opportunity of gleaning some knowledge of the adjacent country while recovering from the effects of my march on foot; and I mean, in this communication, to give the most trustworthy of my gleanings concerning the eastern or lower portion of the same river.

Strangers are so liable to be unintentionally misled by the careless answers of uninterested inhabitants, I would fain have subjected every important point to the test of personal examination, but except in the cases of gold, coal, iron, and a hot fountain, which did not involve any additional fatigue, I had to rely on the information of others alone. The difference of climate must account for the disproportionate exhaustion experienced by myself and companions from marches of a dozen miles, compared with that produced in our naval officers by those prodigious strides we read of having been performed in the Arctic Circle. Indeed I was pretty well “knocked up” by not much more than a month on foot; the climate on the river felt hot and steamy, water never cool, clothes always damp from profuse perspiration; and as the country is generally covered with long grass, bushes, and trees, the abundance

* See Mr. Macqueen's Papers, R. G. S. Journal, vol. xxvi.

of well-rounded shingle everywhere renders it necessary to keep the eyes continually on the ground. Pedestrianism under such circumstances might be all very well for those whose obesity calls for the process of Pressnitz ; but for one who had become as lean as a lath, the only discernible good was that it enabled an honest sort of man to gain a vivid idea of " a month on the treadmill."

Looking down the Zambesi from those remarkable falls, which I think ought to be named after our Queen, " the smoke-sounding falls of Victoria," the river is seen fringed on both sides by ranges of hills from 800 to 1000 feet in height. On the right or southern bank the hills cease at Lupata ; but on the left they run along to Seña, terminating in the fine high mountain Morumbala, which has a hot sulphureous fountain on its northern summit. A very large number of conical-shaped hills ornament the ranges ; and as all are covered to their tops with fine leafy trees and patches of lighter green grass between, the scenery is always pleasing ; it was particularly so in my voyage down from Tété, for winter having commenced the foliage had changed into the most varied hues before falling. Some were inky black, others copper-coloured, and others of so bright an orange that I have turned aside to them in the belief that they were masses of flowers.

At this season, also, the stimulus of cold acts like that of heat on birds in our climate. " The time of the singing of birds had come." It is far from true that the birds of at least this portion of the Tropics are unmusical ; they have wanted poets only to bring them into notice, as ours have had from the time of Aristophanes to the present day.

The river Zambesi itself is magnificent, until spoiled by spreading out in this sickly delta. Measured at the fort of Tété, it was found to be 500 fathoms or 1000 yards broad, and that is a narrow part. Below Lupata it spreads among large, reedy islands, to a breadth from 1 to 2 or more miles.

It has been in flood ever since we struck it in December last, and it looks as if it would remain high for more than a month to come. These five months of high water show the statement to be substantially correct that it is navigable for considerable-sized launches for half the year. Three and occasionally four freshets occur annually at Tété. The flood of northern waters, which inundates the Barotse and Seshéke valleys, comes into the Makololo country in February ; the flood of the Chobé is always a month later, on account of the impediment which the extreme tortuosity of the river's bed presents to its flow. It is often heard of as spreading over the lands 30 or 40 miles above Linyanti a fortnight before it floods that place. In the case of the rivers of Libébé Teoughe, Zō or Tzō, and Tamunakle, the flood descends sometimes in April, at other times much later, but it is not capable of

making an inundation except in the country near Libébé, as it is discharged into the lake till that is full—the surplus finding its way down the Zouga to Kumadau, and a little way beyond.

The water in these floods is in all cases perfectly clear; this peculiarity enabled me to distinguish the water of the valley inundations in a large rise of the river which took place at Teté in the beginning of March. To the inhabitants it seemed the third freshest of that year; but the water being comparatively limpid enabled me to connect it with the overflowing at Sesheké in February. The two previous floods, produced by rains falling east of the eastern ridge, imparted a deep reddish-brown tinge to the Zambesi. This flood had but a partial discolouration effected by the numerous feeders of the Zambesi continuing to pour in some muddy water, until the winter began in April; and, as they are very numerous above Teté, we perceive the reason why the remarkable floods of the clear water of the great interior valley have not been noticed farther down.

I am aware of no obstruction to navigation from the bottom of the eastern ridge to the delta, except one named Kebrabasa, about 30 miles above Teté. There a number of jagged rocks jut out of the stream right across the river, forming in high water a dangerous rapid; and at low water the flow is so zigzag that the canoes must be taken ashore and hauled along the bank. It is near the district called Chicova; but, being on foot when we came near that point, we were obliged to leave the river to avoid crossing the troublesome rivulets which the Zambesi in its rise had filled; and we did not know till we arrived at Teté that we had thereby missed the opportunity of examining the only impediment we are likely to meet with in our returning upward course.

Above Lupata, which is about 40 miles below Teté, the river is kept rather narrow by the hills and rocks on its banks; it may be said to be from 1000 to 1200 yards broad. The current is $3\frac{1}{2}$ miles per hour. The gorge of Lupata is about 200 or 300 yards wide, 12 miles in length, and rather winding, but so deep close to its rocky perpendicular banks that a large steam-ship could pass through at full speed.

Below Lupata the river becomes very broad, and full of large, reedy islands, which prevent one from seeing the banks. I conjectured the breadth from occasional glimpses of dark, low-lying woodland on the south, and the ranges of Maganja hills on the north. A sailing vessel would now have more room to tack in here than in the Clyde above Greenock. I, however, saw it only when the river was full.

In the dry season it presents a very different appearance, but it is never without a very large volume of water, flowing in a somewhat winding channel. But though both channel and islands

change their positions from time to time, according to the swing and force of the full flood, free passage is always afforded for launches and large canoes, and the river is never fordable.

Minute interrogation leads me to believe that a steamer of light draught could ply on the Zambesi during the greatest part of the year; but the opinion of a seaman might be very different. Our surveyors, however, and visitors to Quilimane have had but little opportunity of knowing the capabilities of the river; for that which is called the river of Quilimane no more deserves the name of Zambesi, than does the Serpentine that of the Thames. Its proper name is "Mutu," and the point of departure from the main stream "Mazaro," or "mouth of Mutu." Mazaro may thus be considered the beginning of the Quilimane delta, as the Mutu, though small, is the first branch which leaves the Zambesi for the sea. Its claims may be understood when I mention that even now, when the water is at its greatest height, the upper part of the Mutu is only three or four yards broad. It is also very winding, and so full of reeds and water-plants, together with overhanging branches of trees, that a small canoe even can with difficulty pass along. During a great part of the year it is dry, rendering it necessary to employ land-carriage for 12 or 15 miles in the case of all commerce to and from Quilimane and the interior. Beyond the part which annually stands dry, the Mutu receives two rivers from the north, called Pingazi and Luaala, which make it navigable. Another farther down, named Likwaré, and the tides, contribute to form the river of Quilimane. The bar at its entrance is very dangerous, as it admits small vessels only twice a month, and it is a common remark that but few of these go both in and out unscathed. This bar embittered the joy I might otherwise have felt on gaining the eastern coast, for on approaching Quilimane the sad news was communicated that eight of my countrymen, in coming from H. M. brigantine Dart to offer me a passage homewards, had unfortunately lost their lives. It caused me the most poignant sorrow, and made me feel as if it would have been easier for me to have died for them than to bear the thought of so many being cut off from all the joys of life in generously endeavouring to render me a service.

The Portuguese, in extenuation of the apparent disadvantage of building the "capital of the rivers of Seia" (Quilimane) where it possesses such slender connection with the Zambesi, allege that the Mutu in former times was large, but is now filled up with alluvial deposit. The bar, too, was safer then than it is now. To a stranger it looks remarkable that the main stream of the Zambesi, sometimes called Cuama and Luabo, which is, at least, three quarters of a mile broad at the mouth of the Mutu, should be left to roll on to the ocean unused. It divides, it is true, below that

into six or seven branches ; but two of these, named, near the sea, Melambe and Catrina, present comparatively safe harbours at their mouths and free passage into the interior for large launches during the entire year. These harbours are not more insalubrious than Quilimane and Seña.

With respect to Quilimane, one could scarcely have found a more man-killing spot than it. The village is placed on a large mud-bank, so moist that water is found by digging two feet deep, and it is surrounded by mango-bushes and marsh. The walls of the houses, too, sink gradually, so as to jam the doors against the floors. That the subject of securing a better harbour for the commerce of the magnificent country drained by the Zambesi merits the attention of the Portuguese Government, as interested in its prosperity, a glance at the articles which might be exported to a great amount will sufficiently show.

If we again fancy ourselves looking down the Zambesi, from its confluence with the river Loangwa, we find that a soft grey sandstone rock, with many silicified trees and palms on the surface, forms, to use an ungeological expression, the flooring of the country all the way to Lupata. This space, a trapezoid in form, extends 3° of longitude and 2° or more of latitude, and is, if I am not mistaken, a field of coal ; for the rock is in many places cut through and dislocated by dykes of greenstone and basalt. There are also broad bands of gneiss and porphyry, with hills of baked clay and igneous rocks, containing much silica and mica.

Coal.—The disturbances effected by the eruptive rocks in the grey sandstone have brought many seams of coal to the surface. There are no fewer than nine of these in the country adjacent to Teté, and I came upon two before reaching that point. One seam in the rivulet Muatize is 58 inches in diameter ; another is exposed in the Morongoze, which, as well as the Muatize, falls into the Revubue, and that joins the Zambesi from the north about two miles below Teté. The Revubue is navigable for canoes during the whole year, and but for a small rapid in it, near the points of junction with these rivulets, canoes might be loaded at the seams themselves. Some of the rocks have been ejected in a hot state since the deposition of the coal, for it is seen in some spots converted into coke, and about 10 miles above Teté there is a hot fountain emitting abundance of acrid steam ; the water at the point of emergence is 158° Fahr., and when the thermometer is held in it half a minute it shows steadily 160° . When frogs or fish leap into it from the rivulet in which it is situated, they become cooked, and the surrounding stones were much too hot for the bare feet of my companions.

The remarks about the absence of any tradition of earthquakes in my last letter must be understood in reference to the country

between the ridges alone, for I find that shocks have frequently been felt in the country of the Maravi, and also at Mosambique, but all have been of short duration, and appeared to pass from east to west.

Iron.—In addition to coal, we have iron of excellent quality in many parts of the country. It seems to have been well roasted in the operations of nature, for it occurs in tears or rounded masses, admitting of easy excavation with pointed sticks, and it shows veins of the pure metal in its substance. When smelted it closely resembles the best Swedish iron in colour and toughness. I have seen assegais made of it strike the crania of hippopotami and curl up instead of breaking, the owner afterwards preparing it for further use by straightening it, while cold, with two stones.

Gold.—If we consider Tete as occupying a somewhat central position in the coal-field, and extend the leg of the compasses about $3\frac{1}{2}^{\circ}$, the line which may then be described from north-east round by west to south-east nearly touches or includes all the district as yet known to yield the precious metal. We have five well-known gold-washings from north-east to north-west. There is Abutua, not now known, but it must have been in the west or south-west, probably on the flank of the eastern ridge. Then the country of the Bazizula, or Mashona, on the south, and Manica on the south-east. The rivers Mazoe, Luia, and Luenya in the south, and several rivulets in the north, bring gold into the coal-field with their sands; but from much trituration it is generally in such minute scales as would render amalgamation with mercury necessary to give it weight in the sand, and render the washing profitable. The metal in some parts in the north is found in red clay-shale which is soft enough to allow the women to pound it in wooden mortars previous to washing. At Mashinga it occurs in white quartz. Some of the specimens of gold which I have seen from Manica and the country of Bazizula (Mosusurus!) was as large as grains of wheat, and those from rivers nearer Tete were extremely minute dust only. I was thus led to conclude that the latter was affected by transport, and the former showed the true gold-field as indicated by the semicircle. Was the eastern ridge the source of the gold, seeing it is now found not far from its eastern flank?

We have then at present a coal-field surrounded by gold, with abundance of wood, water, and provisions—a combination of advantages met with neither in Australia nor California. In former times the Portuguese traders went to the washings accompanied by great numbers of slaves, and continued there until their goods were expended in purchasing food for the washers. The chief in whose lands they laboured expected a small present—one pound's worth of cloth perhaps—for the privilege. But the goods

spent in purchasing food from the tribe was also considered advantageous for the general good, and all were eager for these visits. It is so now in some quarters, but the witchery of slave-trading led to the withdrawal of industry from gold-washing and every other source of wealth; and from 130 or 140 lbs. weight annually, the produce has dwindled down to 8 or 10 lbs. only. This comes from independent natives, who wash at their own convenience, and for their own profit.

A curious superstition tends to diminish the quantity which might be realised. No native will dig deeper than his chin, from a dread of the earth falling in and killing him; and on finding a piece of gold it is buried again, from an idea that without this "seed" the washing would ever afterwards prove unproductive. I could not for some time credit this in people who know right well the value of the metal; but it is universally asserted by the Portuguese, who are intimately acquainted with their language and modes of thought. It may have been the sly invention of some rogue among them, who wished to baulk the chiefs of their perquisites, for in more remote times these pieces were all claimed by them.

Agriculture.—The soil formed by the disintegration of igneous rocks is amazingly fertile, and the people are all fond of agriculture. I have seen maize of nearly the same size of grain as that sold by the Americans for seed in Cape Town. Wheat, for which one entertains such a friendly feeling, grows admirably near Teté, in parts which have been flooded by the Zambesi, and it doubles the size of the grain at Zumbo. When the water retires the sowing commences. A hole is made with a small hoe, a few grains dropped in, and the earth pushed back with the foot. This simple process represents all our draining, liming, subsoil-ploughing, &c.; for with one weeding a fine crop is ready for the sickle in four months afterwards.

Wheat, sugar, rice, oil, and indigo were once exported in considerable quantities from Teté. Cotton is still cultivated, but only for native manufacture. Indigo of a large kind grows wild all over the country. There are forests of a tree which acts as the cinchona near Senna. Does not this show the Divine care over us?—where fever prevails the remedy abounds. We have also sarsaparilla, calumba-root, and senna-leaves in abundance; the last I believe to be the same as is exported from Egypt.

It may not be out of place here to call attention to native medicines as worthy the investigation of travellers. I have always had to regret the want of time to ascertain which were efficacious and which were not, and whether there are any superior to our own. It is worthy of note that the bark, which is similar in properties to that which yields the quinine, has been known as a

potent febrifuge by the natives from time immemorial. Our knowledge of the virtues of the bark is comparatively recent. Some may think we have more medicines in the Pharmacopœia than we know well how to use, but the fact of well-educated persons resorting to Homœopathy, Holloway's ointment, Morison's pills, and other nostrums, may indicate an actual want, to be supplied by something more potent than either raillery or argument. Few such I imagine would in cool blood prefer Parr's life pills to quinine in intermittent fever; and if we had a remedy for cholera only half as efficacious as quinine in Quilimane fever, it would be esteemed a universal blessing. Many native remedies are valueless, perhaps the majority are so; but they can cure wounds inflicted by poisoned arrows. In Inhambane and Delagoa Bay a kind of croup prevails: it is probably the *Laringismus stridulus*, as it attacked and proved very fatal to adults. Singularly enough, it was unknown till the first visit of Potgeiter's Boers to Delagoa Bay, who brought it from parts to the south-west where it prevails, and left it there, though none of them were suffering from it at the time. It is still unknown here. This case is analogous to ships leaving diseases at the South Sea Islands. After many had perished, a native doctor pointed out a root which, when used in time, effects a speedy cure. The Portuguese now know the remedy and value it highly. I am not disposed to believe everything marvellous; but from excoriations having been made, by means of the root, on the tongue of the patient, and abstraction of blood so near the seat of the disease having been successful in this very intractable disease, I think the black doctor deserves some credit. The fact, too, that certain plants are known by widely separated tribes all over the country as medicinal, is an additional reason for recommending those who have nothing but travel and discovery on hand to pick up whatever fragments of aboriginal medical knowledge may come in their way.

In addition to the articles of commerce mentioned above, I saw specimens of gum copal, orchilla-weed, caoutchouc, and other gums. There are two plants, the fibres of which yield very strong thread and ropes. Bees abound beyond Tete, but the people eat the honey and throw the wax away. There are several varieties of trees which attain large dimensions, yielding timber of superior quality for durability in shipbuilding. I saw pure negroes at Seña cutting down such trees in the forest, and building boats on the European model, without the superintendence of a master. Other articles of trade are mentioned by writers, but I refer to those only which came under my personal observation.

I feel fully persuaded that, were a stimulus given to the commerce of the Zambesi by a small mercantile company proceeding

cautiously to develop the resources of this rich and fertile country, it would certainly lead to a most lucrative trade. The drawbacks to everything of this sort must, however, be explicitly stated; and though anxious to promote the welfare of the teeming population of the interior by means of the commercial prosperity and intercourse of the coasts, I should greatly regret any undue expectations from unconsciously giving a too high colouring to my descriptions. I shall therefore try to explain the causes of the miserable state of stagnation and decay in which I found the Portuguese possessions.

I have already stated that the slave-trade acted by withdrawing labour from every other source of wealth in this country, and transferring it to the plantations of Cuba and Brazil. The masters soon followed the slaves; hence this part of Africa contains scarcely any Europeans possessing capital and intelligence or commercial enterprise. Of those who engaged in the slave-trade in both eastern and western Africa, it is really astonishing to observe how few have been permanently enriched by it. There seems a sort of fatality attending these unlawful gains, for you again and again hear the remark, "He *was* rich in the time of the slave-trade." Beyond all question, it has impoverished both the colonists and the country. And when our cruisers, by their indomitable energy, rendered the traffic much more perilous than any other form of gambling for money, they conferred a double benefit. The slave was prevented from being torn from his home and country, and the master was compelled to turn to more stable sources of income and wealth. But when this took place it was found that the strong arms which washed for gold and cultivated coffee, cotton, wheat, indigo, sugar, earthnuts for oil, &c., were across the Atlantic, and a civil war breaking out completed the disorder.

On the south bank of the Zambesi, Nyande, a man of Portuguese and Asiatic extraction, rebelled and collected a band of every shade of bad character in the country. Building a stockade at the confluence of the Luenya and Zambesi, below Tete, he could rob every vessel that came up the river; for the Luenya rushes with great force into the Zambesi, and in order to avoid being carried to the opposite rocky bank by the current it is necessary to ascend the Luenya first and cross it at a point which will ensure the boat being carried not more than half-way across the river into which it rushes; in doing so the vessel comes right to the stockade of Nyande. This rebel burned nearly all the houses of Tete.

On the northern bank another of Portuguese extraction rebelled and burned all the rich villas to which the merchants were wont to retire for ease and pleasure. These rebels, though not in

alliance with each other, kept the loyal inhabitants of Tete shut up in their fort for two whole years ; and so strict was the blockade that they were unable to get goods from the coast for trade, and scarcely enough for the purchase of food even. They had also to endure the usual lot of adversity ; friends not only became cool, but often turned enemies. A neighbouring chief of no great power, whose predecessor rejoiced in the name of the "Emperor Monomotapa," was one of the latter. Real Caffres or Zulus, here named Landeens, overran many districts of the country : they attacked Seña, and more than once since have compelled the inhabitants to pay tribute. The rebels have not been punished.

In coming down the river I passed the stockade of Nyande ; and, in consequence of a note from Major Secard, I was kindly received by his (Nyande's) son-in-law, who entertained me to dinner and breakfast, and added some goats to our provisions for the voyage. It speaks well for this worthy commandant that the natives hold him in so much respect, his simple presence has put a stop to hostilities four times. His generous hospitality to myself and large party demands my lasting gratitude.

These notices of the war are not intended to inculcate either party ; a passing stranger can scarcely form a correct judgment, especially if he espouses either side ; they are given in order that the stagnation of trade may be understood.

When the influence of the white man was at its lowest ebb among the natives, we happened to come down the river. The people possess more of the Caffre than Bechuana character. An Italian had ascended the river, with about fifty followers armed with guns, some months before our visit, and committed great havoc on some defenceless villages. On returning a number of tribes united and destroyed both him and his force. We were in some danger from a chief spreading the report in our front that we had committed similar deeds to those of the Italian ; and many bands of armed men were observed collecting to award us a like treatment. Our explanations were, however, considered satisfactory ; indeed, when we could get a palaver, they were never unreasonable until we came close to Tete ; but it was unpleasant to be everywhere suspected. The men belonging to some chiefs on the Zambesi never came near us unless fully armed ; others would not sit down, nor enter into any conversation, but after gazing at us for some time with a sort of horror they went off to tell the chief and great men what they had seen. We appeared an uncouth band, for the bits of skins, *alias* fig-leaves, had in many cases disappeared, and my poor fellows could not move about without shocking the feelings of the well-clothed Zambesians. The Babisa traders (Muizas) bring large quantities of cotton cloth from the coast to the tribes beyond Zumbo. Both

Moors and Babisa had lately been plundered too. They could not have taken much from us, for the reason contained in the native proverb, "You cannot catch a humble cow by the horns."* We often expected bad treatment, but various circumstances conspired to turn them from their purposes.

It is impossible to enumerate all the incidents which, through the influence of our Divine protector on the hearts of the heathen, led to our parting in friendship with those whom we met with very different sentiments; but I must not omit the fact that, if our cruizers had accomplished nothing else, they have managed to confer a good name on our country. I was quite astonished to find how far the prestige had spread into the continent; and in my case they had ocular demonstration of more than a hundred evidently very poor men going with one of "that white tribe" without either whip or chain. My headman speaks the language perfectly, and being an intelligent person he contributed much by sensible explanations to lull suspicion. We had besides no shields with us; this was often spoken of, and taken as evidence of friendly intentions; and for those who perversely insisted that we were spies, we had forty or fifty gallant young elephant-hunters, and the extraordinary bravery they sometimes exhibited seemed to say it would scarcely be wholesome to meddle with such fellows. The personal character of some chiefs led at once to terms of friendship. With others we spent much time in labouring in vain to convince them we were not rogues and vagabonds: they were in the minority, as the utterly bad are everywhere else. With fair treatment the inhabitants on the Zambesi would, I believe, act justly; they are not powerful as compared with our Caffres of the Cape. The so-called emperors, as Monomotapa, Cazembe, &c., are not so powerful as Sandillah and Moshesh.

Some of the Batonga and many of the Maravi women have an ugly custom of piercing the upper lip below the nose, and of inserting a shell or reed, so as to widen and draw out the orifice until it is quite an inch beyond the perpendicular of the nose. Fashion never induced a freak more mad. It looks as if they thought that female beauty of lip had been attained by the *ornithorhynchus paradoxus* alone. Lower down the river they insert a button only, and they possess much influence. My men thought they used their power very creditably when they said, "Dance, and we will grind corn for you."

I shall notice but one point more. Lupata is mentioned as 40 miles below Tété. The range has a gorge in it through which the Zambesi flows. There is a perpendicular wall and an island

* Synonymous with the Scotch proverb, "You can't take the breeches off a Highlander."

on the left of the western entrance. This island was called the "Island of Mosambique," by Dr. Lacerda, from a belief that it stands on the same latitude with that settlement, viz. $15^{\circ} 1' S$. I found it to be $16^{\circ} 34' S$. I have no wish to prove that worthy gentleman wrong, but all my observations are erroneous if he is right. I found Teté to be in $16^{\circ} 8' 48''$, and an island below Lupata $17^{\circ} 0' 30''$.

It is always an ungracious task to find fault with others, but I am obliged to perform the duty in the case of this same Lupata. The word is nearly synonymous with Litako, anglicised into Lattakoo (now Kuruman), viz. walls, or rather dry stone dykes. Pata, or 'mpata, is applied to any defile in hills, particularly if it has perpendicular or wall-like sides. There is one called Mpata, through which the Zambesi comes, near Zumbo. The person who first wrote Lupata, or "*spine of the world*," Tala Mungongo, "*or castle of rocks*," did not mean, I hope, that the underlined sentences were translations, but only more poetic names—for the one means "walls," and the other "Behold the range." This range (Lupata) was said to be so high that snow lay on it during most of the year, and to consist of marble of great value. We slept a night on the island of Mosambique at the western entrance, where there is a fine view of the highest part in the whole range, viz. the right wall. It is perpendicular, and appears scarcely so high as Arthur's Seat, when viewed from about Prince's Street, Edinburgh! I question if it is more than 700 feet high from the river at its base, though it may be 800 or 900 feet above the level of the sea. The island is composed of a light-coloured compact silicious schist, which may have been rent off from the opposite wall; for the strata are all huddled and twisted together as if it had been roughly handled when soft. At the eastern entrance there are three conical hills of porphyry, with fine square and rounded crystals.

The northern part of Lupata range extends into the Maganja country, and then bends round to Seña. The southern part of the same range is rather crooked too, for it runs south and south-east, ending in Nyamonga and Gorongozo mountains, which may be seen from the top of a hill (Baramuana) behind Seña. When Lupata is seen from the east it looks decidedly lower than the Campsie range, as viewed from the vale of Clyde.

The southern end of the range bears south-west from the hill Baramuana, which is about half a mile west of Seña. The intervening country is flat, but well wooded with cumbanzo and other trees. The nearest point of the range is named Nyamonga, Gorongozo being a little beyond it: the latter is famed for its salubrity and crystal waters. The Jesuits once had a station there, and I have observed that they always showed great judgment and taste in the selection of sites. They were rich, having been keen

traders as well as laborious teachers, and could allow their brethren to follow their laudable tastes. On the top of Gorongozo there are several large slabs, or the rocks have been chiselled to appear so, and inscriptions are graven upon them; they are asserted to be in Roman characters. The Portuguese who have seen them not knowing the words (I presume they are in Latin, and the work of the Jesuit fathers), I at first formed the idea of their being in unknown characters, perhaps of a primitive language, or graven by the servants of Solomon the son of David, in their visits to Ophir. After patient inquiry, the assertion that all knew the letters, though not the meaning, made me conclude that the inscriptions are of no great antiquity. Ophir may be sought for near Sofala, but not on the Zambesi; for if the Delta was of old as unhealthy as it is now, Solomon's servants would get a larger share of fever than of gold. Except at a few points the river does not touch the gold-field, and there are no inscriptions or buildings showing antiquity on its banks.

With Sofala it is different, for between that fort and Manica we have the finest gold-field in Africa; and at the foundation of the fort itself articles of *wrought* gold have frequently been found. Such, also, have been picked up in a stream on the main land, and remnants of walls of hewn stone have been exposed in gardens. But the Landeens are there the lords of the soil, and Ophir must remain an open question.

DAVID LIVINGSTONE.

Mauritius, 26th August.

Brought to this island by H. M. brig "Frolic," Commander Peyton, on the 12th—a service for which I feel unfeignedly thankful to the Government of her Majesty. The "Frolic" was just in time to save the lives of the crew of a Hamburg vessel lost near Quilimane. Another month of the climate would have been fatal to the whole. I reached Quilimane labouring under a severe tertian, but found that Captain Nolloth, R.N., late of the "Frolic," had left me some wine; and his surgeon, Dr. Walsh, some quinine—which, with the sympathy and encouragement expressed in letters from my former instructors in Glasgow University, from Commodore Trotter, and from yourself, soon restored me to my wonted vigour. I was most hospitably entertained in Quilimane by Colonel Galdino José Nunes, and here by our countryman the Hon. Major-General Hay. A short residence in his house enables me to announce the departure of an affection of the spleen which clung to me in spite of the comforts and friendship of the officers of

the "Frolic;" and I believe there is still some African service in me. My late companions, 110 in number, await my return at Tete (Tett).

I proceed by the overland route to England in September next, and hope to return so as to pass the Quilimane delta between April and August, 1857.

The headman of the party accompanied me on board the "Frolic" to Mauritius, and, besides feeling grateful to him for his invaluable services, I wished to comply with the desire of Sekelétu, and take him to England, believing that a report of the wisdom and power of Englishmen from his lips would have a beneficial effect on the minds of his countrymen in relation to Christianity. But the excitement of seeing so many new things seemed to prove too much for his brain, and during the night, after seeing the steamer towing us into this harbour, he became quite insane, and drowned himself. He could swim well, but he hauled himself down by the chain cable. I felt unwilling to use restraint, because, being a gentleman in his own country, I feared lest a taint of insanity should remain after our return, and that he might prejudice the minds of his countrymen by representing confinement as an act of cruelty, and my regret for not using constraint is now unavailing.

We lost another headman above Teté by a similar cause. A tribe refused us passage, and made a war-dance close to our bivouackment. As they never dance fully armed and dressed, except when about to attack, and I had no intention to be scared backwards by them, this poor man became mad from excitement, which was probably aggravated by remembrance of former scenes in which he had figured, and ran off by night. We spent three days seeking him, but the country being full of lions we never found a trace of him.

DAVID LIVINGSTONE.